

WATER QUALITY M E M O R A N D U M

Utah Coal Regulatory Program

June 14, 2012

TO: Internal File

THRU: Daron Haddock, Permit Supervisor

FROM: Steve Christensen, Environmental Scientist SC

RE: 2011 Fourth Quarter Water Monitoring, West Ridge Resources, West Ridge Mine, WQ11-4, Task ID #3978

The West Ridge Mine is currently operational in the Book Cliff Mountain range of Carbon County, UT. Water monitoring data is submitted quarterly to the Division EDI database. Beginning on page 7-36 of the approved Mining and Reclamation Plan (MRP), water monitoring protocols and sampling requirements are provided for surface water, ground water, monitoring wells and UPDES outfalls in Tables 7-1, 7-2, 7-3 and 7-4 respectively.

1. Was data submitted for all of the MRP required sites? YES ☒ NO ☐

Springs

The approved MRP outlines the monitoring of six springs (SP-8, SP-12, SP-13, SP-101, SP-102 and S-80). Until the 2nd quarter of 2011, the spring water monitoring plan had included ten springs; however, an amendment was submitted and approved by the Division (Task ID #3738) in March of 2011 that reduced the number of spring monitoring sites to six. The amendment eliminated the monitoring of springs SP-15, SP-16, WR-1 and WR-2. As a result, the monitoring of these springs was discontinued the 2nd quarter of 2011.

Two of the monitored springs (SP-12 and SP-13) discharge from the lower slopes of West Ridge in Whitmore Canyon. Spring SP-8 discharges in the upper drainage of C Canyon. Hanging Rock Spring (S-80) is located near the northwest corner of the permit area and discharges from the east slopes of Whitmore Canyon. Spring 101 monitors Little Spring at the bottom of West Ridge. Spring 102 is located within Spring Canyon.

Based upon recent permitting actions relative to mine expansions into the Right Fork of Whitmore Canyon, two additional springs were added to the water monitoring program: Road Spring and Section 5 Spring. The Permittee began collecting data on these springs in June of 2011. As a result, the 3rd quarter of 2011 is the first quarter of active monitoring for these

springs.

Data was submitted for all required spring monitoring points.

Streams

The approved MRP outlines the monitoring of seven stream sites. Until the 2nd quarter of 2011, the surface water monitoring plan had included twelve stream monitoring sites; however, an amendment was submitted and approved by the Division (Task ID #3738) in March of 2011 that eliminated five of the sites. The amendment eliminated the monitoring of ST-5, ST-6A, ST-7, ST-11, ST-12 and ST-13. As a result, the monitoring of these stream sites was discontinued the 2nd quarter of 2011.

Grassy Trail Creek is the only intermittent/perennial stream in the permit and adjacent areas. The upper drainages of Grassy Trail Creek (i.e. the Left and Right Fork) are monitored quarterly.

Four monitoring sites have been established on the Left Fork (LF-1, LF-2, ST-3 and ST-15). Monitoring sites LF-1 and LF-2 are flume sites where continuous monitoring data is obtained during mid- to high-flow periods. Site ST-15 monitors flow from the Spring Canyon drainage (tributary to the Left Fork).

Three monitoring sites have been established on the Right Fork (RF-1, RF-2 and Patterfore Stream). RF-1 and RF-2 are flume sites where continuous monitoring data is obtained during mid- to high-flow periods. The Patterfore Stream is a tributary to the Right Fork and was established as a monitoring site in the spring of 2011 in order to obtain additional data on the Right Fork drainage.

Data was submitted for all the required stream/surface water monitoring points.

Wells

Quarterly operational sampling is required for one groundwater-monitoring well (Site DH 86-2).

Monitoring well DH 86-2 was sampled during this quarter.

Underground Mine-Water Sample

Monthly samples of the underground, pre-treatment mine water are required. The requirement was established on August 24th, 2010.

The required monthly samples were submitted for this quarter.

UPDES

Operational sampling is required monthly for two active UPDES sites (Permit # UT0025640). Site D001 is the mine sites primary sediment pond discharge to the ephemeral 'C' Canyon drainage. Site D002 is the mine-water discharge to the ephemeral 'C' Canyon drainage. Specific limitations and self-monitoring requirements as outlined in the UPDES permit are presented in the table below:

Effluent Characteristics	Effluent Limitations
Flow, MGD (million gallons per day)	1.0
Total Suspended Solids (TSS), ppm	70
Total Iron, ppm	1.3
Oil & Grease, ppm	10
Total Dissolved Solids (TDS), ppm	2,000
pH	9

Based on three sampling events, Outfall 001 did not report a discharge this quarter. UPDES Outfall 002 reported three discharges.

2. Were all required parameters reported for each site? YES ☒ NO ☐

Spring Monitoring Sites: *All required parameters were submitted for the spring monitoring sites that recorded a flow.*

Surface Water Monitoring Sites: *All required parameters were reported.*

Well Monitoring Site: *All required parameters were reported for monitoring well DH 86-2.*

UG-1: *All required parameters were reported for underground mine-water monitoring site UG-1.*

UPDES: *Outfall 001 did not report a discharge this quarter. Outfall 002 continues to*

discharge continuously. All required parameters were reported.

3. Were any irregularities found in the data?

YES ☒

NO ☐

Surface Water Monitoring Sites-

ST-3- *An increase in TDS and its associated components were reported during the 3rd quarter of 2010. No observable flow was reported the 4th quarter of 2010. ST-3 could not be accessed during the 1st quarter of 011. TDS returned to within historical trend levels for the 2nd and 3rd quarters of 2011. Elevated TDS concentrations were again reported this quarter. A concentration of 441 ppm was reported. The average TDS concentration is 359.60 ppm with a standard deviation of 39.84 ppm.*

ST-6- *Elevated flow values persist at ST-6. As the primary flow component at this monitoring site is mine water discharge, it would appear that the high flow value is a result of increased mine-water discharge.*

A Division Order was issued to the Permittee on April 3rd, 2012 (due July 2nd, 2012). The Division Order requires the Permittee to revise their currently approved Probable Hydrologic Consequences section of the Mining and Reclamation Plan (MRP). The primary purpose of the revision will be to address the mine-water discharge. The MRP does not take into account a sustained and high volume mine-water discharge. The Permittee will need to address the origin of the encountered ground-water and determine (based on data) what the potential impacts of encountering that groundwater are.

Sample ID	Date	Parameter	Value	STD. Deviation
ST-6	6/6/2011	Flow	2,153 gpm	4.07
ST-6	6/6/2011	F-Cond	1,485 umhos/cm	2.95
ST-6	6/6/2011	SO4	542 mg/L	2.8
ST-6	6/6/2011	T-Anis	20.36 meq/L	2.23
ST-6	11/16/2011	D-Mg	51.6 mg/L	2.32
ST-6	11/16/2011	F-Cond	1,702 umhos/cm	2
ST-6	11/16/2011	SO4	535 mg/L	2.9
ST-6	11/16/2011	TDS	1,254 mg/L	2.01
ST-6	11/16/2011	Flow	2,332 gpm	4.45

UPDES Sites- (UPDES Permit #UT0025640)

Site D001- *UPDES outfall D001 (primary sediment pond at mine site) did not report a discharge this quarter.*

Site D002- *UPDES Outfall 002 water quality data was obtained three times this quarter. All of the reported concentrations for TSS, T-Fe and TDS were below the compliance limits as established by the UPDES discharge permit.*

The reported mine water discharge volumes continue to increase. The average flow for the quarter was 1,924.8 gpm for this quarter. The average flow reported the previous quarter (3rd quarter 2011) was 1,696 gpm based on three sampling events.

Spring Monitoring Sites

Spring site SP-101 reported a reduction in Chloride the previous quarter (WQ11-3). The reported value of 2 ppm was 2.12 standard deviations lower than the average of 2.99 ppm. The chloride concentration reported this quarter returned to historic trends.

Spring SP-102 reported a significant increase in flow the previous quarter (WQ11-3). The reported discharge was 4.79 standard deviations above the average of 3.09 gpm with a reported value of 11 gpm. Additionally, an elevated conductivity value was reported at spring SP-102 the previous quarter. An elevated flow reading was again reported this quarter (7.5 gpm). The flow reading is 2.67 standard deviations outside the mean (mean of data set is 3.09 gpm). Conductivity values returned to within historic trends; however, a reduction in pH was reported with a value of 7.8 (average of data set is 8.46).

Spring site SP-13 reported a reduction in conductivity with a reported value of 450 ppm (average value is 854 ppm) the previous quarter. The reported conductivity value for this quarter was within two standard deviations of the mean of the historic data set.

Spring site SP-8 reported a reduction in Dissolved Calcium (D-Ca) the previous quarter. The average value is 77.53 ppm. The D-Ca value reported 3rd quarter 2011 was 2.59 standard deviations below the mean with a reported value of 63.25 ppm. The D-Ca concentration reported this quarter was within two standard deviations of the mean. However; an elevated carbonate concentration was reported this quarter. The average carbonate value is 19.60 ppm. A carbonate concentration of 71 was reported this quarter.

4. On what date does the MRP require a five-year re-sampling of baseline water data.

On page 7-36 of the approved MRP, the Permittee commits to collecting baseline samples "from each spring in the monitoring program during the low flow (fall) sampling and from each stream monitoring sites during low flow every five years beginning with the first mid-term review."

Baseline sampling of ground and surface water sites will be required during the 3rd

quarter of 2011.

5. Based on your review, what further actions, if any, do you recommend?

Continue to monitor the data irregularities cited above for any trends.

6. Does the Mine Operator need to submit more information to fulfill this quarter's monitoring requirements?

YES ☐

NO ☒

7. Follow-up from last quarter, if necessary.

YES ☐

NO ☒

